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In one aspect the invention accordingly resides in apparatus for conditioning air and fuel supplied to a combustor, comprising:

5 means for electrostatically charging air supplied to a combustor, at a first polarity, the means extending into a first duct through which, in use, air flows to the combustor;

means for electrostatically charging fuel supplied to such  
10 combustor, at opposite polarity to said first polarity, the means extending into a second duct through which, in use, fuel flows to the combustor; and

means for preheating such fuel;

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wherein the apparatus further comprises an earthed electrode within a duct selected from the first duct and the second duct.

20 Preferably the apparatus is adapted to charge air at negative polarity and to charge fuel at positive polarity.

The charging means may in each case comprise one or more pointed electrodes adapted to be connected to electric power  
25 supply means and extending into the first duct and/or the second duct.

The earthed electrode within the first duct and/or second duct may be provided upstream of the pointed electrode(s) in  
30 the sense of the flow of air or fuel through the duct.

The fuel may be preheated by heat exchange with fluid heated by the combustor. Additionally, or alternatively, the fuel

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may be preheated by electrically powered means. When both are provided, the apparatus may further comprise control means adapted to operate the electrically powered heating means when the fluid heat exchange means are ineffective to preheat  
5 the fuel to a specified temperature (for example, when the combustor has not yet reached its normal working temperature).

The invention also resides in a combustor equipped with air  
10 and fuel conditioning apparatus as defined above.

The invention also resides in a method of conditioning air and fuel supplied to a combustor, comprising the steps of:

15 electrostatically charging such air at a first polarity within a first duct through which, in use, air flows to the combustor;

electrostatically charging such fuel at opposite polarity to  
20 said first polarity within a second duct through which, in use, fuel flows to the combustor; and

preheating such fuel;

25 characterised by providing an earthed electrode within a duct selected from the first duct and the second duct.

These and other features of the present invention will now be more particularly described, by way of example, with  
30 reference to the accompanying schematic drawings in which:

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## CLAIMS

1. Apparatus for conditioning air and fuel supplied to a combustor, comprising:

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means (5) for electrostatically charging air supplied to a combustor, at a first polarity, the means extending into a first duct (2, 3, 4) through which, in use, air flows to the combustor;

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means (12) for electrostatically charging fuel supplied to such combustor, at opposite polarity to said first polarity, the means extending into a second duct (9, 10, 11) through which, in use, fuel flows to the combustor; and

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means (15, 19; 20) for preheating such fuel;

characterised by further comprising an earthed electrode (7; 14) within a duct selected from the first duct and the second duct.

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2. Apparatus according to claim 1, characterised by being adapted to charge air at negative polarity and to charge fuel at positive polarity.

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3. Apparatus according to claim 1 or claim 2, characterised in that said means for electrostatically charging air

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comprises one or more pointed electrodes (5) adapted to be connected to electronic power supply means and extending into the first duct (2, 3, 4).

- 5 4. Apparatus according to claim 3, characterised in that the earthed electrode (7) within the first duct (2, 3, 4) is upstream of said pointed electrode(s) (5) in the sense of flow of air through the first duct.

- 10 5. Apparatus according to any preceding claim, characterised in that said means for electrostatically charging fuel comprises one or more pointed electrodes (12) adapted to be connected to electric power supply means and extending into the second duct (9, 10, 11).

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6. Apparatus according to claim 5, characterised in that the earthed electrode (14) within the second duct (9, 10, 11) is upstream of said pointed electrode(s) (12) in the sense of flow of fuel through such duct.

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7. Apparatus according to any preceding claim, characterised in that said preheating means (15, 19; 20) are located upstream of said means (12) for electrostatically charging fuel in the sense of flow of fuel to the combustor.

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8. Apparatus according to any preceding claim, characterised in that said preheating means comprise means (15, 19) for preheating such fuel by heat exchange with fluid heated by the combustor.

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9. Apparatus according to any preceding claim characterised in that said preheating means comprise electrically powered heating means (20).

10 10. Apparatus according to claim 9, characterised in that said electrically powered heating means comprise an element (20) disposed within the duct (9, 10, 11) through which, in use, fuel flows to the combustor which serves also as said earthed electrode (14).

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11. Apparatus according to claim 8, 9 or 10, characterised by further comprising control means (21, 22) adapted to operate said electrically powered heating means (20) when said fluid heat exchange means (15, 19) are ineffective to  
20 preheat such fuel to a specified temperature.

12. A combustor characterised by being equipped with apparatus according to any preceding claim for conditioning air and fuel supplied to the same.

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13. A combustor according to claim 12, characterised by being an internal combustion engine.

14. A method of conditioning air and fuel supplied to a  
5 combustor, comprising the steps of:

electrostatically charging such air at a first polarity within a first duct (2, 3, 4) through which, in use, air flows to the combustor;

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electrostatically charging such fuel at opposite polarity to said first polarity within a second duct (9, 10, 11) through which, in use, fuel flows to the combustor; and

15 preheating such fuel;

characterised by providing an earthed electrode (7; 14) within a duct selected from the first duct and the second duct.

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15. A method according to claim 14, characterised by being performed by means of apparatus according to any one of claims 2 to 12.